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(12) PATENT APPLICATION
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199948730 A1

(54) Title
Missile swirling mechanism

(51)[7] International Patent Classification(s)
F42B 015/01
F41G 007/00
F42B 010/60
F42B 015/10

(21) Application No: 199948730

(22) Application Date: 1999.09.16

(43) Publication Date : 2001.03.22

(43) Publication Journal Date : 2001.03.22

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ABSTRACT

A missile swirling mechanism is disclosed. The mechansia consists of a cylindrical tube (1) shown as fitted to a missile (2), with one protruding section (3) which has a forward facing surface area angled rearwards which induces a lateral force on the cylindrical tube (1) during forward flight. Another protruding section (4) has a surface area at an angle to the forward direction of flight, which protruding section (4) acts to induce a rotational force on the cylindrical tube during flight by the missile.

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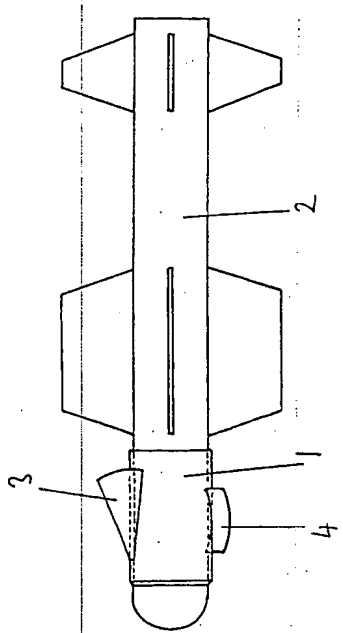

FIG. 1

MISSILE SWIRLING MECHANISM

This invention relates to the steering mechanism field of guided missile operation.

Numerous systems exist to counter attacks from guided missiles. Some mechanisms rely on decoys to distract an incoming missile or radar jamming to interfere with missile guidance mechanisms. Other systems actively search and destroy incoming missiles. This latter system is the system usually used by ships against anti-ship missiles, and by ground forces against ground to ground or air to ground missiles. Many of the systems that seek to destroy incoming missiles are capable of tracking incoming missiles, and some manufacturers claim to be able to destroy incoming missiles that can move from side to side or in a wave type movement.

This invention provides an attachment that would allow a missile to travel in a circular motion or in a set of parabolic movements to its target, where such movement is

evident when the in coming missile is viewed from the front. By being an attachment, it can be attached to exisitng missiles and enhance the evasive techniques of exisitng missiles or new missiles specifically built to accommodate the attachment. For example, while the attachment can induce circular or parabolic movement of a missile, a missile can still use existing mechanisms to induce fluctuating sideway movements, or a wave type of movement. The combination would virtually make such a missile impossible to destroy prior to impact with its target.

The invention disclosed herein relies on the anti-roll systems of missiles to be effective in inducing lateral deflections and the guidance systems of missiles to make corrections for lateral deflections caused by the invention. The combined effect of laterally induced deflections and the subsequent corrections cause the missile to adopt either a circular motion or, depending on the shape of the missile and position of the attachment on the missile, a parabolic

motion. The attachment can be crudely constructed without moving parts, and as such can be relied on to be effective throughout the flight of the missile.

The invention in one form is a cylindrical tube of such a diameter that it snuggly fits around part of the body of a chosen missile. A section protruding from the cylindrical tube is shaped so that part of its surface area impacts with on coming air during forward flight by the missile, and through that impact with on coming air by the surface area, a lateral deflection of the cylindrical tube is induced. Another part of the surface area is shaped and angled so that when that other section impacts with oncoming air during forward flight, a rotational movement of the cylinder is induced.

In another form, the invention is a cylindrical tube of such a diameter that it snuggly fits around part of the body of a chosen missile. A section protruding from the cylindrical tube is shaped so that part of its surface

area impacts with on coming air during forward flight by the missile, and through that impact with on coming air by that surface area, both a lateral deflection and a rotational movement of the cylindrical tube is induced.

In another form, the invention is a cylindrical tube of such a diameter that it snuggly fits around part of the body of a chosen missile. A section protruding from the cylindrical tube is shaped so that part of its surface area impacts with on coming air during forward flight by the missile, and through that impact with on coming air by that part of the surface area of that protruding section, a lateral deflection of the cylindrical tube is induced, while part of the surface area of another protruding section is shaped so that when the surface area of that other protruding section impacts with oncoming air during forward flight, a rotational movement of the cylindrical tube is induced.

The shapes of surface areas of the said sections protruding from the cylindrical tube can be flat or curved.

In one form of the invention, an electrc motor is connected to the cylindrical tube to control the rotational speed of the cylindrical tube.

In one form of the invention a battery is used to provide electrical power for the electric motor that controls the rotational speed of the cylindrical tube.

In another form of the invention a generator with a propeller fitted to it is used to provide electrical power for the electric motor that controls the rotational speed of the cylindrical tube.

In another form of the invention where an electric motor is used to control the rotational speed of the cylindrical tube, a computer is also connected to control electric currents to the electric motor, to induce programmed movements.

In another form of the invention, a friction inducing fitting is attached between the part of the respective missile and the cylindrical tube, to restrict the freedom of rotational movement of the cylindrical tube in a controlled manner.

In one form of the invention the friction inducing fitting consists of a lever connected to an electric motor, which motor pulls the lever so that as the lever is pulled, the lever is pressed against the cylindrical tube, thereby using friction to control the rate of rotation of the cylindrical tube.

In another form of the invention where the said friction inducing fitting is attached, the friction inducing fitting is controlled by a computer, to allow preprogrammed variations in friction, and thus allow controlled variations in the rate of rotation of the cylindrical tube relative to the respective missile.

In one form of the invention the said sections protruding outward from the said cylindrical tube are positioned in front of the said cylindrical tube so that they protrude outwardly infront of the cylindrical tube.

In another form of the invention the said sections protruding from the said cylindrical object are positioned so that they protrude radially outward from the cylindrical tube.

In another form of the invention the said sections protruding from the said cylindrical tube are positioned so that they protrude outward to the rear from the cylindrical tube.

In one form of the invention, the said cylindrical tube is a moulded tube.

In another form of the invention the said cylindrical tube is assembled from components.

In one form of the invention where a section protrudes from the cylindrical tube, the cylindrical tube together with that protruding section, is formed as a single moulded unit.

In another form of the invention where more than one section protrudes from the cylindrical tube, the cylindrical tube together with those protruding sections, is formed as a single moulded unit.

In another form of the invention where more than one section protrudes from the cylindrical tube, the cylindrical tube together with at least one protruding section, is formed as a single moulded unit, and any other protruding section is seperately attached to the said moulded unit.

In one form of the invention where a section protrudes from the cylindrical tube, the cylindrical tube and the said protruding section are assembled together into a unit.

In another form of the invention where more than one section protrudes from the cylindrical tube, the cylindrical tube and those protruding sections are assembled together into a unit.

In one form of the invention bolts are attached to the respective missile to which the missile attachment is to fitted, which bolts are attached on the missile at the point beyong which the said cylindrical tube should not move rearward along the respective missile, with the rear end of the cylindrical tube able to press against the said bolts during flight of the respective missile.

In the drawings:

Figures 1, 2, and 3 show the missile swirling mechanism attached to a guided missile, viewed at different points of rotation. Figure 1 shows the cylindrical tube 1 encircling part of the missile 2. Figure 1 shows a protruding section 3, protruding radially outward, which section 3 has a flat surface area facing primarily the forward direction during flight, but sloping rearward. This protruding section 3 acts to induce a lateral movement in the cylindrical tube as a whole. Another protruding section 4 has a surface area that faces a direction that has the forward direction only as component. This other protruding section 4 acts to induce a rotational movement in the cylindrical tube. Figure 4 shows the missile swirling attachement as viewed from the front.

The claims defining this invention are as follows:

1. A missile attachment, which said missile attachment is an attachment for guided missiles and which said missile attachment consists of a cylindrical tube with a protruding section, which said protruding section protrudes outward from the cylindrical tube, and which said protruding section has a forward surface area, and which said forward surface area faces a direction, which said direction has the forward direction as a component, where the said forward direction is the direction of travel that the cylindrical tube as a whole would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched, with a part of the respective missile encircled by the said cylindrical tube when the said cylindrical tube is attached to the respective missile, with the said cylindrical tube attached to the missile such that the said cylindrical tube is able to rotate relative to the encircled section of the respective missile.

2. A missile attachment, which said missile attachment is an attachment for guided missiles and which said missile attachment consists of a cylindrical tube with a protruding section, which said protruding section protrudes outward from the cylindrical tube, and which said protruding section has a surface area, and where part of the surface area, which is the forward surface area, faces the forward direction, where the said forward direction is the direction of travel that the said cylindrical tube as a whole would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched, with another part of the surface area of the said protruding section facing a direction that has the said forward direction only as a component, which said other surface area is the secondary part of the surface area, with a part of the respective missile encircled by the said cylindrical tube when the said cylindrical tube is attached to the respective missile, with the said cylindrical tube attached to the missile such that the said cylindrical tube is able to rotate relative to the encircled section of the respective guided missile.

3. The missile attachment of claim 2, wherein the said secondary part of the surface area is flat.

4. The missile attachment of claim 2, wherein the said secondary part of the surface area is curved.

5. The missile attachment of any one of claims 2 to 4, wherein the said secondary part of the surface area is slanted forward relative to the cylindrical tube, where forward is the said forward direction of travel that the cylindrical tube as a whole would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

6. The missile attachment of any one of claims 2 to 4, wherein the said secondary part of the surface area is slanted rearward relative to the cylindrical tube, where rearward is the opposite direction of travel to forward, and forward is the said forward direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

7. The missile attachment of any one of claims 1 to 6, wherein the the said cylindrical tube is formed as a single moulded unit.

8. The missile attachment of any one of claims 1 to 6, wherein the said cylindrical tube is formed as an assembly of components.

9. The missile attachment of any one of claims 1 to 7, wherein the said protruding section and the said cylindrical tube are formed as a single moulded unit.

10. The missile attachment of any one of claims 1 to 8, wherein the the said protruding section and cylindrical tube are formed by assembling the said protruding section and the said cylindrical tube.

11. The missile attachment of any one of claims 1 to 10, wherein the said protruding section protrudes radially outward from the said cylindrical tube.

12. The missile attachment of any one of claims 1 to 10, wherein the said protruding section protrudes forward from the said cylindrical tube, where forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement when attached to a missile, after the respective missile is launched.

13. The missile attachment of any one of claims 1 to 10, wherein the said protruding section protrudes rearward from the said cylindrical tube, where rearward is opposite to forward, and forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

14. A missile attachment, which said missile attachment is an attachment for guided missiles and which said missile attachment consists of a cylindrical tube with a protruding section, which protruding section protrudes outward from the cylindrical tube, and which said protruding section is the primary protruding section and which said primary protruding section has a forward surface area, and which the said forward surface area faces the forward direction, where the said forward direction is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched, with a secondary protruding section protruding from the said cylindrical tube, which said secondary protruding section has a surface area, which surface area is the secondary surface area, and which said secondary surface area faces a direction that has the forward direction only as a component, with a part of the respective missile encircled by the said cylindrical tube when the said cylindrical tube is attached to the respective missile, with the said cylindrical tube attached to the missile such that the said cylindrical tube is able to rotate relative to the encircled section of the respective guided missile.

15. The missile attachment of claim 14, wherein the said secondary protruding section protrudes radially outward from the said cylindrical tube.

16. The missile attachment of claim 14, wherein the said secondary protruding section protrudes forward from the said cylindrical tube, where forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

17. The missile attachment of claim 14, wherein the said secondary prodruding section protrudes rearward from the said cylindrical tube, where rearward is opposite to forward, and forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

18. The missile attachment of any one of claims 14 to 17, wherein the said cylindrical tube is formed as a single moulded unit.

19. The missile attachment of any one of claims 14 to 17, wherein the said cylindrical tube is formed as an assembly of components.

20. The missile attachment of any one of claims 14 to 18, wherein the said secondary protruding section and the said cylindrical tube are formed as a single moulded unit.

21. The missile attachment of any one of claims 14 to 18, or 20, wherein the said primary protruding section and the said cylindrical tube are formed as a single moulded unit.

22. The missile attachment of any one of claim 14 to 18, wherein the said primary protruding section and the said cylindrical tube are formed as a single moulded unit.

23. The missile attachment of any one of claims 14 to 19 or 22, wherein the said secondary protruding section and the said cylindrical tube are formed by assembling the said secondary protruding section and the said cylindrical tube.

24. The missile attachment of any one of claims 14 to 20, or 23, wherein the said primary protruding section and the said cylindrical tube are formed by assembling the said primary protruding section and the said cylindrical tube.

25. The missile attachment of any one of claims 14 to 24, wherein the said secondary surface area is flat.

26. The missile attachment of any one of claims 14 to 24, wherein the said secondary surface area is curved.

27. The missile attachment of any one of claims 14 to 26, wherein the said secondary surface area is slanted forward relative to the cylindrical tube, where forward is the said forward direction of travel that the said cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

28. The missile attachment of any one of claims of 14 to 26, wherein the said secondary surface area is slanted rearward relative to the cylindrical tube, where rearward is the opposite direction of travel to forward, and forward is the said forward direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

29. The missile attachment of any one of claims 14 to 28, wherein the said secondary protruding section protrudes radially outward from the said cylindrical tube.

30. The missile attachment of any one of claims 14 to 28, wherein the said secondary protruding section protrudes forward from the said cylindrical tube, where forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

31. The missile attachment of any one of claims 14 to 28, wherein the said secondary protruding section protrudes rearward from the said cylindrical tube, where rearward is the opposite of forward, and forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

32. The missile attachment of any one of claims 14 to 31, wherein the said primary protruding section protrudes radially outward from the said cylindrical tube.

33. The missile attachment of any one of claims 14 to 31, wherein the said primary protruding section protrudes forward from the said cylindrical tube, where forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

34. The missile attachment of any one of claims 14 to 31, wherein the said primary protruding section protrudes rearward from the said cylindrical tube, where rearward is opposite to forward, and forward is the direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

35. The missile attachment of any one of claims 1 to 34, wherein the said forward surface area is flat.

36. The missile attachment of any one of claims 1 to 34, wherein the said forward surface area is curved.

37. The missile attachment of any one of claims 1 to 36, wherein the said forward surface area is slanted forward relative to the cylindrical tube, where forward is the said forward direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

38. The missile attachment of any one of claims 1 to 36, wherein the said forward surface area is slanted rearward relative to the cylindrical tube, where rearward is the opposite direction of travel to forward, and forward is the said forward direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

39. The missile attachment of any one of claims 1 to 38, wherein the said forward surface area is perpendicular to the said forward direction of travel relative to the cylindrical tube, where forward is the said forward direction of travel that the cylindrical tube would experience during flight, apart from rotational movement, when attached to a missile, after the respective missile is launched.

40. The missile attachment of any one of claims 1 to 39, wherein an electric motor connects the said cylindrical tube to the respective guided missile in such a manner that the electric motor is able to rotate the said cylindrical tube relative to the respective missile.

41. The missile attachment of claim 40, wherein a battery is used to provide electical power to the said electrical motor.

42. The missile attachment of claim 40, wherein a generator, rotated by a propeller attached to the generator, is used to provide electical power to the said electrical motor.

43. The missile attachment of any one of claims 40 to 42, wherein a programmed computer controls the amount of electrical power supplied to the said electric motor.

44. The missile attachment of any one of claims 1 to 39, wherein a lever is attached to the respective guided missile, which lever is attached such that it can be pressed against the said cylindrical tube with varying degrees of force, which force is provided by an electric motor connected to the said lever, and which electric motor is controlled by a computer, with electrical power for the said electric motor supplied by a battery carried by the respective guided missile.

45. The missile attachment of any one of claims 1 to 44, wherein bolts are attached to the respective missle to which the missile attachment is to be fitted, which bolts are attached such that they protrude radially outward from the respective missile and limit the longitudinal movement of the cylindrical tube with respect to the respective missile.

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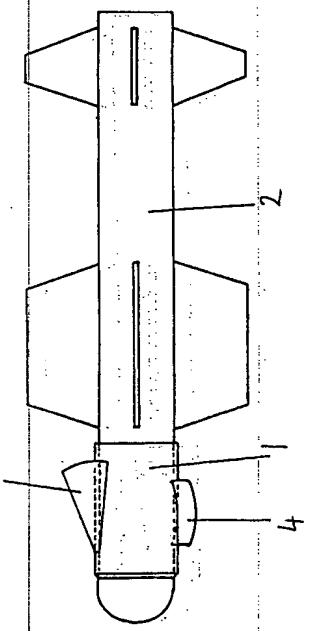

FIG. 1

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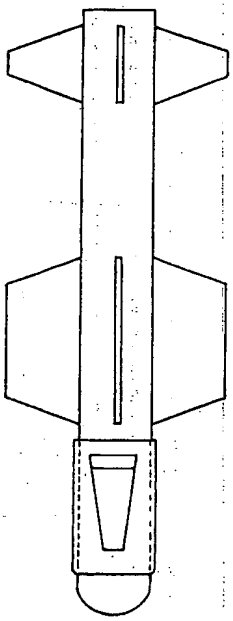

FIG. 2

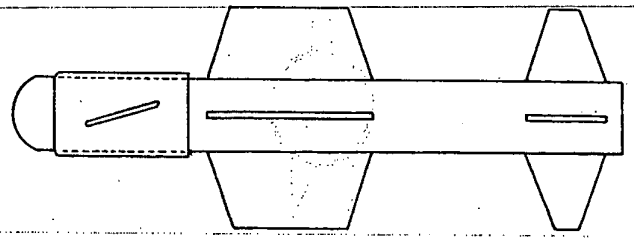

FIG. 3

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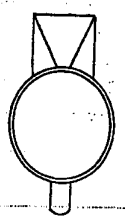

FIG. 4